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of America, with descriptions of new genera and species, and critical remarks on others. Part I.—Annelida, Gephyræa, Nemertina, Nematoda, Polyzoa, Tunicata, Mollusca, Anthozoa, Echinodermata, Porifera. By A. E. Verrill. (From the Proceedings of the U. S. National Museum.) 8vo, pp. 42.

Report of the Entomologist to the Department of Agriculture, Charles V. Riley. (From the Annual Report of the Department of Agriculture for the year 1878.) 8vo, pp. 51, 7 plates.

Preliminary Report on the Genera and Species of Tubificidæ. By Gustav Eisen. (Communicated to the R. Swed. Acad. of Sc., March 12, 1879.) 8vo, pp. 24, 1 plate.

Mollusca of H. M. S. *Challenger* Expedition. Trochidæ continued, viz: The genera Basilissa and Trochus and the Turbinidæ, viz: the genus Turbo. By Rev. R. Boog Watson. (Ext. from the Linnean Society's Journal—Zoölogy, Vol. xiv.) 8vo, pp. 25.

On the Mollusca procured during the *Lightning* and *Porcupine* Expeditions, 1878–70. Part II. By J. Gwyn Jeffreys. (From the Proc. of the Zoölogical Soc. of London, June 17, 1879.) 8vo, pp. 36, 2 plates.

Eighth Annual Report of the Curators of the Museum of Wesleyan University, Middletown, Conn., 1879. 8vo, pp. 15.

Sur la Structure des Glandes Génitales Femelles chez la Taupe (Communication préalable). Par M. Jules MacLeod. (Extrait des Annales de la Société de Médecine de Gand.) 8vo, pp. 4.

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GENERAL NOTES.

BOTANY.

MOTHS ENTRAPPED BY AN ASCLEPIAD PLANT (PHYSIANTHUS) AND KILLED BY HONEY BEES.—Towards the last of September, Mr. John Mooney, of Providence, an observing man, brought us a stalk of *Physianthus albens*, an Asclepiad plant originating in Buenos Ayres, with the bodies of several moths (*Plusia precatonis*) hanging dead by their proboscides or maxillæ. It was found that the moths had, in endeavoring to reach the pollen pockets, been caught as if in a vise by one of the opposing edges of the five sets of hard horny contrivances covering the pollinia. A few days after, Mr. Everett A. Thompson, of Springfield, Mass., wrote us, that he had a plant of the same species which had caught a number of moths of several species, and that in some cases only the heads and tongues of the moths were left, and he attributed this dismemberment to birds, but wrote in the same letter that his father had seen bees sting the moths while alive and struggling. He sent me one of the moths, which proved to be a *Plusia precatonis*, the same species as we had observed in Providence, and a honey bee (*Apis mellifica*) which had been seen by his father to attack the moths, and which had a pollen mass of the same plant attached to one of its fore legs. On writing Mr. Thompson that his father's observations were quite new, the hive bee not being known to be carnivorous, beyond its well-known habit of stinging and killing the males of its own species and the bee moths invading its cells, his father, Rev. L. Thompson, of North Woburn, Mass., a careful observer, kindly prepared the following statement:

"I cannot undertake to give an account of my observations of the plant, moths and bees, concerning which inquiry is made, from the standpoint of a scientist, which I do not claim to be, but after pretty close watching, continued for many days, I feel quite confident of the general correctness of the following statement:

"Early in September, of the present year, as I made one of my daily visits to the plant, to me unknown before, the *Physianthus albens*, or Arauja, I noticed among the many moths that had been caught in the flowers, a considerable number of tongues still in the traps, while all, or nearly all, else belonging to the recent captives had disappeared. While I stood gazing, my attention was arrested by two or three bees buzzing immediately around as many entrapped moths that were alive and struggling to get away. Every moment or two, the bee suddenly and furiously darted upon the prisoner and seemed to me to sting it despite its desperate efforts to escape. This onset was generally instantaneous, but was repeated again and again, and, after the moth became still and apparently lifeless, the bee settled upon it, and, if my eyes did not greatly deceive me, began to devour it. I had previously noticed the tongues but supposed the bodies of the moths had been eaten by birds, though I had not actually seen it done. I cannot therefore positively assert what seemed to me the fact at the time, though I had no other thought, and the fact that so many of the moths had actually disappeared, leaving only their tongues, and, in some cases, other fragments of their bodies, in the shape of legs clinging to bits of casing or skin, satisfied me that the bees had really feasted on animal food as well as upon the nectar of surrounding flowers.

"I did not suppose it to be the honey bee at the time, but a kind of wasp, such as or similar to that whose nest I had sometimes found in sodded banks or terraces and looked upon as an architectural wonder. Yet I did not examine it, and can only say that I saw many, or supposed I did, upon a bed of *Nasturtiums* and other flowers, a few feet distant from the *Physianthus*.

"I think I have found as many as three or four different kinds of moths upon the plant, besides numerous small black flies which, unlike the moth, go down *bodily* into the flower.

"L. THOMPSON.

"*North Woburn, Oct. 29, 1879.*"

Upon writing Dr. Hermann Müller in reference to these facts, he replied as follows:

"Lippstadt, Nov. 10, 1879.—*Physianthus albens* has been observed by Delpino as being visited by humble bees and fertilized by their proboscis. It is a new and very interesting fact that *Plusia precatationis* is caught by the flowers of this plant and has been found dead suspended by its proboscis. About carnivorous habits of bees, my brother Fritz, in south Brazil, has observed that honey bees (but I do not remember for the moment whether *Apis*

or stingless Brazilian honey bees) licked eagerly the juice dropping from pieces of flesh which had been suspended in order to be dried in the open air. Nothing else as far as I know has ever been published on the carnivorous habits of bees; I hope, therefore you will soon publish your very interesting observations."

We have also received the following letter from Mr. Darwin, dated Down, Beckenham, Kent, Nov. 23d. "I never heard of bees being in any way carnivorous, and the fact is to me incredible. Is it possible that the bees opened the bodies of the *Plusia* to suck the nectar contained in their stomachs? Such a degree of reason would require repeated confirmation and would be very wonderful. I hope that you or some one will attend to the subject."

We have also received the following note from Prof. Gray in reference to the subject: "It has long been familiar, and must several times have been recorded, that moths or butterflies and other insects are caught by getting their tongue, proboscis or legs into the chink between adjacent wings of the anthers in *Physianthus* or *Arauja albens*, and *Asclepias*, etc. The anther-wings are very rigid, the groove between them narrows gradually upwards, so that when a leg or proboscis is engaged, an upward pull only fixes it more securely, and the unhappy insects seem rarely to pull backward or downward, which is the only way to get disengaged. As to the rest of your account I know nothing; and should say that the observations need, if not 'repeated confirmation,' at least some confirmation by an entomological observer."

It appears from the fact that the single worker bee received had a pollen-mass attached to one of its fore legs, that it visited the plant originally for the sake of its nectar. For what purpose did it attack, kill the moths and, as is claimed, "devour" them? We publish the observations of Mr. Thompson and the comments upon them, with the hope that the subject will receive attention next summer.

Since this note has been put in type, Prof. A. J. Cook, of the Agricultural College of Michigan, well known as an apiarian of experience, informs us that *within the hive*, honey bee workers in killing the drones tear them in pieces with their mandibles rather than sting them, and that he has seen them thus kill a humble bee that had entered the hive; it thus appears, what we judge will be quite new to entomologists, that the honey bee uses its mandibles, at least on some occasions, as weapons of attack, quite as much as the sting; this would also corroborate the exactness of Mr. Thompson's observations.—*A. S. Packard, Jr.*

PROF. HEER ON SEQUOIA.—At the recent meeting of the Helvetic Society of Natural Sciences, Professor Heer read a paper in the Botanical section, on the palæontological history of *Sequoia*. This genus is now represented by only two distinct species, forming the celebrated forests of big trees in California, and known to

botanists as *S. sempervirens* and *S. gigantea*. Prof. Heer finds that the genus attained its greatest development during the Tertiary epoch, though it was before largely represented in the Cretaceous. Between the two types above named, palæontological collections have furnished as many as 24 fossil species; of which number 14 belong to the Tertiary, and 10 to the Cretaceous. The lower chalk alone furnishes 5, two of which, strange to say, are closely similar to the surviving species (if not identical). *Sequoia* has not, as yet, been found in Jurassic formations, though these are rich in Coniferæ.

BOTANICAL NOTES.—The *Bulletin* of the Torrey Botanical Club for October, contains notes on the flora of the Lake Superior Copper region, by A. Hollick, and descriptions of the new fungi, by F. Baron Thueman.—In the *Botanical Gazette* for November, C. H. Peck describes new species of fungi; T. Meehan remarks on Viscidity as a seed-distributor; while Dr. Gray notices *Vaccinium macrocarpon*, var. *intermedium* of the Columbia river.—To the *California Horticulturist* for November, Mr. B. B. Redding contributes a note on the valuable edible qualities of the camass root, which is extensively used as an article of food by the Indians of the western Territories and the Pacific slope.—In Trimen's *Journal of Botany* for November, Mr. S. H. Vines describes the alternation of generations in the Thallophytes. The recent deaths of Mr. John Miers in the 72d year of his age, and of Fenzl, the Austrian botanist, are announced.

ZOÖLOGY.¹

CHANGES IN THE SHELL OF LIMNÆA MEGASOMA PRODUCED BY CONFINEMENT.—In a paper by R. P. Whitfield, read at a late meeting of the Boston Society of Natural History, and entitled, "Description of the animal of *Lymnæa megasoma* Say, with some account of the changes produced by confinement in aquaria and under unnatural conditions," Mr. Whitfield states that he succeeded in keeping alive a specimen of this species in an isolated position in an aquarium in his house at Albany. These specimens were obtained at Burlington, Vt., in the summer of 1867. Two of them speedily died, but the third one survived the change to its new abode until the following spring. In February it laid eggs supposed to have been unimpregnated. After twenty days the animals escaped from the eggs. In the spring of 1868 many of these were removed to localities in the vicinity of Albany. During February, 1869, those of this lot still remaining in the aquarium deposited their eggs, and again during the early part of the following summer.

From the winter brood, specimens were reared which deposited eggs in the early part of 1870.

¹The departments of Ornithology and Mammalogy are conducted by Dr. ELLIOTT COUES, U. S. A.